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April 18, 2001

Commander
Atlantic Division
Naval Facilities Engineering Command
1510 Gilbert Street (Building N-26)
Norfolk, Virginia 23511-2699

Attn: Mr. Kirk Stevens
Navy Technical Representative
Code EV23

Re: Contract N62470-95-D-6007
Navy CLEAN, District III
Contract Task Order (CTO) 0181
Final Supplemental Field Investigation Project Plans
Site 89, MCB, Camp Lejeune, North Carolina

Dear Mr. Stevens:

Baker Environmental, Inc. (Baker) and CH2M Hill are pleased to submit two copies (one unbound) of the Final Supplemental Field Investigation Project Plans for Site 89. The Project Plans include the Work Plan, Quality Assurance Project Plans (QAPP), Field Samples Analysis Plan (FSAP) and Health and Safety Plan (HASP). This final version of the Project Plans addresses the formal comments submitted by the Partnering Team. The Final Project Plans have also been submitted to:

- Environmental Management Division, MCB, Camp Lejeune –Rick Raines (1 copy)
- CH2M Hill – Mike Slade and Scott Bailey (2 copies)
- USEPA – Gena Townsend (1 copy)
- NC DENR – Dave Lown and Charlie Stehman (2 copies)
- IT/OHM – Jim Dunn (1 copy)
- ATSDR – Carole Hossom (1 copy)

We would like to thank the Partnering Team for their insightful review comments on the Draft Final Project Plans. The review comments have been incorporated into the final document. Also, responses to comments from the Partnering Team are provided with this submittal. We appreciate the opportunity to serve LANTDIV on this project. Should you have any questions regarding this submittal, please feel free to contact me at (412) 269-6083, or Rich Bonelli at (412) 269-2033.

Sincerely,

BAKER ENVIRONMENTAL, INC.

Tracey O'Keefe, P.E.
Project Manager

TLO/lp

cc: Ms. Lee Anne Rapp, P.E., LANTDIV, Code EV31 (w/o attachment)
Ms. Beth Collier, LANTDIV, Code AQ115 (w/o attachment)



**Response to Comments
on the
Draft Final Supplemental Investigation Project Plans**

Attachment A
Response to USEPA Region IV Comments

Work Plan Comment #1

Page 3-8, Section 3.5 - The EPA Guidance for Organic analyses has been updated. The new reference is "USEPA, National Functional Guidelines for Organic Data Review (EPA-540/R-99-008)(PB99-963506)". The web address is <http://www.epa.gov/superfund/programs/clp/guidance.htm>.

Response

The reference will be updated as noted in the comment.

FSAP Comment #2

Page 6-2, Section 6.1.2 - The text states that the encore sampler will be used for confirmatory sampling. This is an acceptable method, however, I was cautioned, that unless the design has been improved, the sampler has a tendency to clog with the smallest pebble. If this occurs, the sampler would have to be opened to clear the clog and you would begin to lose the VOAs. The second sampling method that can be used or have it as a standby would be to use the methanol preservation technique.

Response

Baker assumes that by "clogged" the EPA is referring to the presence of large particles on the sealing surfaces of the Encore Sampler body and cap that prevents proper closure of the cap. Baker has encountered this problem in the past and has mitigated it by insuring that the sealing surfaces are clean prior to closure.

FSAP Comment #3

The updated method for analyzing soil samples is 8021B. It can be found in the SW-846 manual, <http://www.epa.gov/epaoswer/hazwaste/test>.

Response

It is not clear to what section this comment refers. Method 8021B is for analysis of VOCs by GC equipped with either a PID or ECD. We plan on using GC/MS methods in the field. This is due to past on-site analytical problems associated with the use of GC methods. Table 7-1 of the FSAP will be revised to show that method 8260B (VOCs by GC/MS) adapted for the field, will be performed.

Work Plan Comment #4

The plan proposes doing confirmatory borings, however it would be better to take a confirmatory sample at the time the MIP encounters any concentration equivalent to 1 - 5 ppm of total VOCs. This was determined to be an appropriate MIP trigger concentration for picking up a DNAPL sample based on the results of confirmatory sampling at the private site "Florida Petroleum".

Response

Comment noted. Select confirmatory soil samples (including those that exhibit a concentration equivalent to 1-5 ppm of total VOCs) will be analyzed on-site using GC/MS methods.

Attachment A
Response to NC DENR Superfund Section Comments

Work Plan Comment #1

Page 3-6, Last Paragraph: If the ribbon NAPL sampler (RNS) is effective below the water table, consider the advantages of doing more RNS and less Membrane Interface Probe.

Response

The advantage of the RNS is that it provides a relatively quick, but qualitative vertical profile of DNAPL distribution. However, it does not provide a vertical concentration profile or a stratigraphy characterization like the MIP does. Detailed stratigraphy characterization, particularly in the suspected DNAPL area, is an important goal of the investigation. The RNS works well in conjunction with the MIP. Not only will the RNS provide an assessment of the presence or absence of NAPL; it will be used to "calibrate" the MIP response to NAPL. Thus, the MIP will be the primary investigative tool, while the RNS will provide support.

Work Plan Comment #2

Page 3-7, Groundwater Investigation: Stainless steel casing will hamper the collection of hydrogen data for natural attenuation evaluation.

Response

Baker agrees with the comment, however stainless steel is proposed over other materials because of its resistant to extreme heat, chemical compatibility, manufacture quality control, and ease of use in well construction. Additionally, a natural attenuation evaluation may or may not be performed, and can be completed without hydrogen data. Therefore, Baker feels the benefits of stainless steel outweigh its liabilities.

Work Plan Comment #3

Figure 4-1: Change "NC DEHNR" to "NC DENR."

Response

"NC DEHNR" will be changed to "NC DENR."

FSAP Comment #4

Page 4-1, Last Paragraph: Collecting and sampling of soil samples for laboratory analysis of VOCs should follow SW 846 Method 5035.

Response

The text will be revised to read, "Samples for laboratory analysis will be collected...by SW 846 Method 5035 (using EncoreTM Samplers)".

FSAP Comment #5

Page 6-1, Paragraph 6: What is the Modified Bermeister Classification System?

Response

The Bermeister Classification System is a visual/field classification system used by some state departments of transportation (e.g., NJ DOT). Baker has adapted it for environmental work.

FSAP Comment #6

Page 7-1, First Paragraph: The most recent Region IV SOP is 1996 with 1997 revisions and can be found at the following link:

<http://www.epa.gov/region04/sesd/eisopqam/eisopqam.pdf>

Response

The text reference was in error and will be corrected. Baker does use the 1996 Region IV SOPs (with 1997 revisions).

FSAP Comment #7

Page 8-1, Last Paragraph: Change "Department of Environment, Health, and Natural Resources (DEHNR)" to "Department of Environment and Natural Resources (DENR)."

Response

The text will be revised to read, "Department of Environment and Natural Resources (DENR)."

QAPP Comment #8

Figure 4-1: Change "NC DEHNR" to "NC DENR."

Response

"NC DEHNR" will be changed to "NC DENR."

QAPP Comment #9

Table 6-2: Holding time for TCL Volatile Organic Compounds should follow SW846 Method 5035. For unpreserved samples, the holding time is 48 hours.

Response

The first entry on Table 6-2 will be revised to reflect that VOC analysis will follow SW846 Method 5035, and that the holding time is 48 hours.

Attachment A
Response to Camp Lejeune EMD-IR Comments

Work Plan Comment #1

Section 3-4 Page 3-6 Soil Investigation: This section states that the soil borings will be a "maximum of 20 feet deep, but could be deeper". How will this be determined? I assume that this statement is being made because it is anticipated that the DNAPL will not be deeper than 20' but that all attempts to delineate the contamination will be made even if it is greater than 20' deep.

Response

Correct. The proposed 20-ft depth is based on available data, which indicate that a relatively fine-grained layer is present between 14-ft and 18-ft below ground surface in some areas within the source zone. Contaminant concentrations decrease significantly through this layer. Baker anticipates that this layer may be a capillary barrier to vertical migration if it is continuous across the source area. The MIP will give real time contaminant concentrations and stratigraphy information with depth. This information will be used to determine when the vertical extent of DNAPL has been delineated.

FSAP Comment #2

Section 4.2.2 Page 4-2 Analytical Requirements - Because we are relying on the RNS, ECD and MIP sampling equipment for delineation of the source plume and the fact that few of the reviewers or readers of this plan have an understanding of these equipment it would be beneficial if you could provide copies of the SOPs for the use of this equipment. From my limited understanding the MIP and RNS are there just to determine the presence of DNAPL and the ECD is a tool for determining the VOC concentration. How does the ECD do this?

Response

At the March 15, 2001 partnering meeting information was distributed to the partnering team regarding the operating principles of Ribbon NAPL Sampler (RNS), electronic capture detector (ECD) and Membrane Interface Probe (MIP). This should help with understanding how this equipment works. The MIP, in tandem with a conductivity probe provides a vertical VOC concentration distribution and a stratigraphy profile. The MIP by itself provides no definitive information regarding the presence or absence of DNAPL. The RNS will be used to determine the presence or absence of DNAPL. The RNS will also help "calibrate" MIP responses to the presence of DNAPL. The ECD is one of several types of detectors on the MIP and gas chromatograph (GC). Other types of detectors include the photo ionization detector (PID) and flame ionization detector FID. ECD is more sensitive to chlorinated compounds and will be used for this investigation on the MIP and GC.

FSAP Comment #3

Section 4.2.2: This section reads to me that there will be 56 borings installed. 4 of these will have RNSs deployed, an undetermined number will use the dye shake test and the rest will have MIPs deployed to determine the presence and distribution of DNAPL. The RNSs and the dye-shake test are there to qualitatively confirm the MIPs. Quantitative data from 30 of the MIPs borings will be verified by the use of an ECD to measure total VOC. 150 samples will be field GC/MS to determine individual VOC concentrations.

My questions are:

Is this correct?

Response

This is not quite correct. Fifty-six (56) borings will be advanced using the MIP rig. The MIP will provide total VOC concentration and stratigraphy vertical profiles. A second rig will follow the MIP rig to collect soil core samples at about 40 MIP boring locations. The purpose of this rig is to collect soil samples for determination of individual VOC concentrations via on-site GC/MS (40 borings x 5 samples = 200 samples). The GC will be equipped with an ECD. The MS will assist in chromatograph peak identification. Ten percent of the samples subject to field GC/MS will split and be shipped to a fixed-base lab to confirm the findings of the field GS/MS. Section 3.4 of the Work Plan and Section 4.2 of the FSAP will be revised to clarify the soil investigation plan.

Where will the quantitative data for the remaining 26 borings come from?

Response

Total VOC quantitative data will be obtained at all 56 borings. Field GC/MS quantitative data will be obtained from 40 of the 56 borings. The distribution of the quantitative data will cover the entire study area (the southern portion of the DRMO). The remaining 16 borings will be used to adequately bound the contamination and fill in gaps.

How will it be determined which qualitative method will be employed at which borings? If the RNSs and the dye-shake test are there to confirm the MIP test wouldn't they be done on the same boring?

Response

The dye shake test will be conducted in conjunction with the second rig that will collect soil core samples. It should be noted that this test is fairly simple and quick, and the cost is insignificant. A small portion of soil from sample cores collected from the suspected DNAPL area (as determined by the MIP) will be reserved for the dye shake test. It is anticipated that dye shake tests will be conducted on samples from many of the 25 closely spaced borings of Figure 4-1. Based on the results of the MIP and dye shake test, the RNS will be deployed. The dye shake test results will provide a gross vertical distribution of DNAPL (from individual samples), while the RNS will provide a continuous vertical distribution of DNAPL. Because the RNS is relatively expensive compared to the dye shake test, the deployment of the RNS will be minimized. Additionally, a qualitative calibration of the MIP to RNS will assist in DNAPL profiling.

How will the boring installation proceed since this is such a flexible plan? Will it be bore, test, confirm, on to the next boring or will there be a bunch of borings installed then tested then decisions made as where to proceed?

Response

The strategy of the boring plan is to start with the borings located along three lines, which are shown on Figure 3-1 of the Work Plan (and 4-1 of the FSAP). This will provide an initial

estimate of the extent of the source area contamination and the extent of the DNAPL zone. The order of the remaining borings will be determined in the field. Some of the planned boring locations may be eliminated if they are not necessary to define the source zone.

Two rigs will be on site. The first rig will perform the MIP/Conductivity borings. The second rig will follow to collect soil cores for on-site GC/MS analysis. The dye shake tests will also be performed, and RNS deployed as necessary.

A production rate of four or five borings per day is anticipated. Each day the MIP subcontractor will provide maps and cross sections showing data collected. Baker personnel will be able to use this data to adjust the plan as necessary to adequately delineate the contamination in the southern portion of the DRMO, particularly once the borings on Lines 1, 2, and 3 are completed.

Attachment A
Response to OHM Remediation Services Comments

Comment #1

Work Plan General - The "fly sheets" in front of the plan sections are mis-numbered. Remove the word "Figure(s)" from the fly sheets

Response

The fly sheet titles will be corrected.

Comment #2

Work Plan Figure 3.1 - Add key indicating what the dotted line on the figure represents

Response

- The solid line represents the estimated extent of the suspected source zone.
- The dashed line represents the projected extent of the suspected source zone.

These keys will be added to the legend on Figure 3.

Comment #3

Work Plan Pg. 2-1, Sec 2.1, last bullet - Change "the IT Group" to OHM Remediation Services

Response

"The IT Group" will be changed to "OHM Remediation Services."

Comment #4

Work Plan Pg.3-3, Sec 3.3.1.3 - Correct spelling (spacing) of "in-situ"

Response

"In-situ" will be spelled "In situ".

Comment #5

Work Plan 2nd PP, 1st sentence - Sentence should be revised to read analytical results (using the solubility criteria presented in 3.3.1.5) and NAPL indicator test will be used to determine DNAPL presence

Response

The first sentence of the last paragraph on page 3-3 will be changed to read, "...the presence of DNAPL will be based on analytical results (using the solubility criteria presented in Section 3.3.1.5) and the results of the NAPL indicator tests...".

Comment #6

Work Plan Pg.3-7, Sec 3.4, 2nd PP - Continuous split spoon sampling will not be appropriate for the TCRA treated and backfilled areas. Sampling should start upon reaching native, untreated soils at an anticipated depth of 6-7 feet below land surface.

Response

Baker concurs. Where references to split-spoon samples occur in the text, it will be noted that sampling for field and laboratory analysis will not occur in the TCRA treated and backfilled areas.

Comment #7

Work Plan Pg. 3-9, Sec. 3.7 - Will a "letter" report be sufficient to present all the data gathered during this project?

Response

No, it will not. The supplemental investigation data and findings will be incorporated into the Technology Evaluation Report. Section 3.7 of the Work Plan will be revised accordingly.

Comment #8

Work Plan Section 5.0 - There is no fly sheet in front of the section text

Response

There should not be fly sheets in front of any sections. Fly sheets should appear only in front of section tables and figures. Any errors will be corrected in the final version.

Comment #9

FSAP General - Check "fly sheets" They are not present in front of several sections and are mistitled (as above) for others

Response

In the hard copy version, the Section 6 Figure fly sheet was mislabeled as "Section 6 Figures". It will be changed to read, "Section 6 Figure."

Comment #10

FSAP Table 7.1 - Container types and preservatives should be added to the table.

Response

The intent of Table 7-1 is to provide information regarding sample analysis. As noted in Section 7.1, information regarding container types and preservatives are provided in Tables 6-1 and 6-2 of the QAPP.

Comment #11

FSAP Pg. 4-2, Sec 4.2.1 last PP - Note that the TCRA excavation depths were over 5 feet in many areas. Sampling should begin upon reaching native, untreated soils.

Response

The text will be revised to read, "...soil samples will not be collected from TCRA-treated soils and backfilled areas, or from depths of less than 5-feet of the ground surface where previous characterization has been performed."

Comment #12

FSAP Pg. 4-3, Sec 4.3.1 - Note that 2-inch diameter wells may not be large enough to accommodate subsurface remedial system components at a later date. Suggest considering 4 inch diameter wells.

Response

The purpose of the proposed wells is for groundwater monitoring. The spirit of the comment is understood. However, based on past experience at other sites where monitoring wells were designed to also accommodate pumps and etc., the additional expense and time required for installation and sampling of larger diameter wells is not justified. At this time, the type and design of the proposed subsurface remedial system has not been determined. As such, the monitoring wells may not be appropriately located or screened at appropriate intervals for use in a future remedial system. Additionally, remedial wells typically use an expensive, continuously wound screen for higher pumping efficiencies. Monitoring wells use a less expensive slotted screen.

Comment #13

FSAP Pg. 5-1, Sec 5.0 - Remove the blank page between 5-1 and 5-2

Response

This blank page was an error in the DPF conversion process and will not appear in the final version.

Comment #14

FSAP Pg. 6-3, Sec 6.1.2 - This section only discusses collection of the soils for VOC analysis. What is the collection procedure and container types for the non-volatile analyses?

Response

Section 6.1.2 will become 6.1.3 in the final version and be revised to include sample collection for non-volatile analyses.

Comment #15

FSAP Pg. 6-9, Sec 6.6, #3 - Suggest utilizing a core barrel sampler or lexan tube to push into and retrieve sediment samples with a minimum of surface water contact

Response

The text will be revised to read, "Sediments will be removed from the streambed using a decontaminated core barrel sampler."

Comment #16

FSAP Pg. 6-11, Sec 6.7, last PP - Check symbols associated with "... Geraghty & Miller's..." and "...(AQTESOLV)..."

Response

The text will be revised to read, "...(AQTESOLV®)..."

Attachment A
Response to NEHC Comments Dated March 30, 2001

HASP Administrative Comment

Activity hazard analyses (AHAs) for the various tasks to be performed under this scope of work were not provided with this document. Therefore, we could not review or provide comments. We recommend use of the three-column format found in reference (d), page 4, Figure 1-1, for its clarity and ease in use.

Response

The HASP contains much of the information contained in the AHA table, however it is not in the format recommended. Baker feels that the on-site staff and subcontractors have and a good understanding of the work activity hazards and means to control hazards. Furthermore, on-site personnel will be informed of site hazards and means to control them prior to the commencement of field activities. Therefore, reformatting the HASP to include AHAs is not warranted.

HASP Comment #1

Pages 2-1 through 2-2, "Site Organization and Coordination":

Comment a) - In the first paragraph, fourth bullet, the Site Health and Safety Officer is listed as "to be determined (TBD)." As this is a site-specific document this information should be readily available.

Comment b) - The second paragraph entitled, "Subcontractor personnel are responsible for:" provides no information stating that the subcontractor(s) will provide site-specific activity hazard analyses (AHAs) for assigned tasks to Baker Environmental, Inc. for approval prior to start of site work.

Response

Comment a) - Mark DeJohn will be the Site Health and Safety Officer (SHSO). Due to the small scope and duration of the project, the dual role of Site Manager and SHSO will not be burdensome.

Comment b) - A bullet item will be added to the section that will read, "Providing to Baker activity hazard analyses (AHAs), as available, for each task they will perform."

HASP Comment #2

Pages 5-1 through 5-2, "Exposure Monitoring":

Comment a) - Section 5.4, "Equipment Calibration," contains no requirement for "after use" calibration of direct reading air-monitoring equipment

Comment b) - A method to inform site personnel of monitoring results is not provided.

Response

Comment a) - The first sentence in will be revised to read, "Equipment calibration...will be completed daily before, and after use."

Comment b) - A sentence will be added at the end of the section that will read, "A summary of each day's air monitoring results will be posted in the Baker field trailer at the end of each day and will remain posted for one day."

HASP Comment #3

Pages 8-1 through 8-10, Section 8.0 "Emergency Procedures":

Comment a) - The first sentence of Section 8.1, entitled "Scope," states "The activities to be conducted under this HASP are not remediation (cleanup), but investigative; . . ." As this scope of work is subject to the requirements of references (a) and (b) above, it is unclear as to why this statement is made.

Comment b) - Section 8.6, "Emergency Hospital Route," states that an emergency hospital route is located in Figure 8-1. The map is not included with this plan.

Comment c) - In Section 8.8.2, entitled "Chemical Injury," the last sentence of the first bullet cites "ANSI Standard 2358.1-1990" for emergency eyewash guidance. The correct citation should be "ANSI Standard Z358.1-1990."

Comment d) - A requirement to periodically exercise and critique the emergency response plan is not provided.

Response

Comment a) - Section 8.1 will be revised to read, "Emergencies such as fire, personal injury, or releases of contaminants to air, water, or soil may occur. If so, local emergency response groups will be called to handle the incident, as necessary."

Comment b) - Figure 8-1 will be included in the Final HASP.

Comment c) - "ANSI Standard 2358.1-1990" will be revised to read, "ANSI Standard Z358.1-1990."

Comment d) - Section 8.17 entitled, "Exercise and Critique of Emergency Procedures" will be added to the HASP. This section will discuss emergency procedure practice.

Attachment A
Response to NEHC Comments (No Date)

General Comment #2:

We agree that the main study question is "What is the extent of the contaminant source zone below the water table in the southern portion of Site 89?" Our main concern is the current and/or future potential for the continued migration of the chlorinated hydrocarbon groundwater plumes through the semi-confining layer of the upper portion of the Castle Hayne Aquifer (e.g., safety and integrity of the water supply wells). We believe that it may be beneficial to use a groundwater model (that is, developed for Camp Lejeune) in future studies to predict whether Site 89 contaminants will be within the influence of the drinking water supply wells once the additional data are available to completely delineate the Dense Non-Aqueous Phase Liquid (DNAPL) and source area and characterize the aquifer(s). It also would be beneficial to address the precautions taken to prevent the enhancement of groundwater migration within the various source areas during the field investigations.

Response

There may be a role for a predictive model in future studies. However, the primary goal of this supplemental Investigation is to define the source area. Baker plans to resume the Long-Term Monitoring (LTM) Program at Site 89 to monitor contaminant migration in both the surficial and Castle Hayne aquifers. In addition, groundwater monitoring wells that will be installed as part of the Supplemental Investigation will be included in the LTM Program.

The evidence collected so far suggests that groundwater contamination in the southern portion of Site 89 is limited in depth and has not penetrated the first semi-confining layer, which is present at approximately 40-feet below ground surface. Furthermore, it is apparent that Edwards Creek is a local groundwater discharge that is influencing groundwater flow above the semi-confining layer, and appears to be a local groundwater divide.

Precautions will be taken during the proposed investigations to mitigate enhancement of DNAPL migration. First, Baker plans to initially identify and characterize any capillary barriers from locations outside the DNAPL source area. Second, each boring will be grouted immediately after completion.

General Comment #3:

The text does not indicate what sampling cycle will be used. The ideal sampling strategy incorporates a full annual sampling cycle. If this strategy cannot be accommodated in the investigation, at least two sampling events should be considered. These sampling events should take place during opposite seasonal extremes.

Response

The DNAPL source zone and dissolved-phase contaminant extent will be delineated once, during the Supplemental Investigation, which is scheduled for June 2001. LTM will be resumed at Site 89 sometime after completion of the Supplemental Investigation. The groundwater plume will likely be monitored twice yearly, in October and April.

Work Plan Comment #1

Pages 2-2 - 2-4, Section 2.2, "Current Site Conceptual Model"

Comments:

a. Page 2-3 of the document defines the acronym/abbreviation for 1,1,2-tetrachloroethane as "112-TCA." This nomenclature should be rechecked and corrected. The acronym/abbreviation for the compound 1,2-dichloroethene is 1,2-DCE.

b. "PCA" is neither defined in the text on page 2-3 nor is it listed in the "Acronym and Abbreviations Section."

Recommendations:

- a. Recheck the nomenclature and correct as necessary.
- b. Provide the nomenclature for "PCA."
- c. Include CAS Numbers, and chemical formulas for each compound, as feasible.

Response

- a. 1,1,2-Tetrachloroethane will be abbreviated as "1,1,2-TCA" in the Project Plans. The changes will be made accordingly.
- b. "PCA" is defined in the third paragraph of Section 1.0, and also appears in the Acronym and Abbreviations Section.
- c. CAS Numbers and chemical formulas of significant contaminants at Site 89 are presented in Material Safety Data Sheets found in Appendix B of the Health and Safety Plan.

Work Plan Comment #2:

Pages 2-2 - 2-4, Section 2.2, "Current Site Conceptual Model"

Comment: The report does not contain a schematic of a site conceptual model (SCM) to include both current and future potential exposure pathways applicable for this site. This would help to identify the potential residual risks remaining from migration of site-related chemicals to various media to include nearby surface waters, etc.

Recommendation: Include a schematic of a SCM that depicts both the current and the future potentially completed exposure pathways.

Response

Neither human health nor ecological risk assessments are included as part of this Supplemental Investigation. Thus, depiction of current and future potential exposure pathways is not necessary.

Work Plan Comment #3:

Pages 3-1 - 3-3, Section 3.3, "Field Investigation"

Comment: As stated above under "General Comments," the potential for continued migration of the chlorinated hydrocarbon groundwater plumes, through the semi-confining layer of the upper portion of the Castle Hayne Aquifer (e.g., safety and integrity of the water supply wells), is not addressed.

Recommendation: Address the distance to the nearest supply well used for drinking water purposes and provide a site map that depicts their locations in relation to Site 89, as applicable. Consider using a groundwater model developed for Camp Lejeune to predict whether Site 89 contaminants will be within the influence of the drinking water supply wells.

Response

The purpose of this Supplemental Investigation is to define the horizontal and vertical extent of significant contamination, including determining if the Castle Hayne aquifer has been impacted. An intermediate well (screened in the upper portion of the Castle Hayne aquifer) will be installed in the source area for this purpose.

The nearest supply wells (PSWTC-1251 and PSWAS-106) are located approximately 2,100-feet south of Site 89. Edwards Creek bounds Site 89 to the south, and appears to be a local groundwater divide.

Steps have been, and will be taken to address potential plume migration toward water supply wells. Two monitoring well clusters were installed south of Edwards Creek to monitor potential plume migration under the creek. Contaminants have not been observed in these wells to date. These wells will be used as sentinels in future LTM monitoring. Additionally, if contamination is detected in the intermediate well in the source area, there is a contingency plan for future work that will include a deep monitoring well installed below the first semi-confining layer.

Work Plan Comment #4:

Page 3-7, "Soil Investigation"

Comments:

a. The text states on Page 3-7 that "Selected samples will be analyzed for total organic carbon (TOC), grain size, synthetic precipitation leaching procedure (SPLP), and laboratory permeability."

b. Reference (a) Section 4.6.2 states that "Although areas of concern are established purposively (e. g., with the intention of identifying contamination), the sampling locations within the areas of concern generally should not be sampled purposively if the data is to be used to provide defensible information for a risk assessment." Risk estimates calculated from sampling data collected from locations expected to have the highest concentrations almost always overestimate the risk. The text should clearly state how analytical data from "purposively selected sample locations" would or will not be used in a human health risk assessment.

Recommendation: The text should clearly state if analytical data from "purposively selected sample locations will be used in a human health risk assessment to estimate human health exposure.

Response

A human health risk assessment is not included as part of this Supplemental Investigation. The purpose of this investigation is source area delineation.

FSAP Comment #5:

Table 7-1, "Summary of Sampling and Analytical Objectives"

Comment: Table 7 does not include metals analysis for Site 89 soils and groundwater, except for investigative-derived waste (IDW) testing purposes. Waste petroleum products, such as, waste oils, frequently contain metals in addition to chlorinated hydrocarbons. Because of this, it may be appropriate to also sample for metals in subsurface soils and groundwater.

Recommendation: Consider sampling for metals for Site 89 subsurface soils and groundwater.

Response

Subsurface soil samples were collected in 1999 for metals analysis. The data indicated that metals contamination was not evident.

FSAP Comment #6:

*Pages 6-2 - 6-3, Section 6.1.2, "Soil Sample Laboratory Submission Procedures"
Appendix A, "Soil Sample Acquisition"*

Comments:

a. Page 6-2 briefly discusses the procedure for using the Encore Sampler for collecting volatile organic compound analysis (VOA) samples for laboratory analysis after split-spoon soil sample collection. The reader is referred to Appendix A for more information. It is unclear whether discrete and/or composite samples are to be analyzed for volatile analysis for samples taken from the grid area. We are concerned with taking composite samples in place of individual discrete samples from the desired soil intervals when obtaining data for use in human health risk assessments (HHRAs).

b. In general, we believe that the laboratory data obtained from analyzing composite samples may not be representative of completed exposure pathways. For example, when addressing a residential exposure to surface soil we assume contact is with the upper six inches depending upon the chemical of concern. Soil concentrations are often the highest in the upper six inches. Therefore composting, or mixing the soil from the upper 12 inches would not be representative of the soil a resident would normally be exposed to. Because of the difficulty with obtaining uniform mixing and the potential for "diluting" the highest concentrations, we prefer taking discrete soil samples instead of composites.

c. *“Appendix A” does not include the actual United States Environmental Protection Agency (U.S. EPA)-approved “Encore Sampler” method.*

Recommendations:

a. *Clarify whether discrete soil samples instead of composite soil samples are to be taken when obtaining data for use in HHRAs.*

b. *Include in Appendix A the U.S. EPA-approved “Encore Sampler” method in its entirety. Ensure that the soil sampling procedures provided in Appendix A agree with the information provided in the text concerning taking soil samples for environmental analysis.*

Response

A human health risk assessment is not included as part of this Supplemental Investigation. However, it should be noted that discrete soil samples will be collected. No composite samples are proposed as part of this investigation. The text in the section entitled, “Soil Sample Laboratory Submission Procedures” will be revised to clarify this. Additionally, Encore sampling methods will be included in Appendix A.